

**ABSTRACT**

The present invention relates to a diamond n-type semiconductor in which the amount of change in carrier concentration is fully reduced in a wide temperature range. The diamond n-type semiconductor comprises a diamond substrate, and a diamond semiconductor formed on a main surface thereof and turned out to be n-type. The diamond semiconductor exhibits a carrier concentration (electron concentration) negatively correlated with temperature in a part of a temperature region in which it is turned out to be n-type, and a Hall coefficient positively correlated with temperature. The diamond n-type semiconductor having such a characteristic is obtained, for example, by forming a diamond semiconductor doped with a large amount of a donor element while introducing an impurity other than the donor element onto the diamond substrate.